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*DB=USPT; PLUR=YES; OP=ADJ*L8

L1 and ((analyz\$ or monitor\$) with network\$) same ((charg\$ or bill\$) with customer\$ with usage\$)

9 L8L7

L1 and ((analyz\$ or monitor\$) with network\$) and ((charg\$ or bill\$) with customer\$ with usage\$).ab.

0 L7L6

L1 and (((analyz\$ or monitor\$) with network\$).ab.) and ((charg\$ or bill\$) with customer\$ with usage\$)

9 L6L5

L1 and (((analyz\$ or monitor\$) with network\$) and ((charg\$ or bill\$) with customer\$ with usage\$)).ab.

0 L5L4

L1 and ((analyz\$ or monitor\$) with network\$) and ((charg\$ or bill\$) with customer\$ with usage\$)

86 L4L3

L1 and ((analyz\$ or monitor\$) with network\$) and ((charg\$ or bill\$) with customer\$)

368 L3L2

L1 and (analyz\$ and network\$ and charg\$ and customer\$).ab.

0 L2L1

(705/\$.ccls. or 709/\$.ccls.)

27463 L1

END OF SEARCH HISTORY

Refine Search

Search Results -

Term	Documents
ANALYZ\$	0
ANALYZ	9
ANALYZA	1
ANALYZABILITY	13
ANALYZABLE	880
ANALYZABLE-NUMBER-OF-TIMES	1
ANALYZAHLE	1
ANALYZAL	1
ANALYZAL-ZEX	1
ANALYZAT	1
ANALYZATE	4
(L1 AND ((ANALYZ\$ OR MONITOR\$) WITH NETWORK\$) SAME ((CHARG\$ OR BILL\$) WITH CUSTOMER\$ WITH USAGE\$)).USPT.	9

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L8

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L8: Entry 1 of 9

File: USPT

Apr 15, 2003

DOCUMENT-IDENTIFIER: US 6549533 B1

TITLE: Managing switched virtual circuits in a network

Detailed Description Text (7):

Generally, with NMS 214 connected to FR network 200, the system may provision customers, establish SLAs, monitor service requests, and allocate and establish appropriate FR SVCs. During SVC operation, the system may track usage, service levels, bandwidth and costs. After tear down of the FR SVC on completion, the system may log usage, SVC bandwidth utilization, duration and customer use and billing information, and archive and report the information to service providers, managers and customers. By managing the entire process from customer account and SLA establishment, frame relay SVC set up, bandwidth- and SLA-based rule set decision making, and usage information accumulation and reporting, NMS 214 generally provides complete administrative control to the service provider for managing SVCs in a VCS network.

Current US Cross Reference Classification (3):709/236Current US Cross Reference Classification (4):709/238

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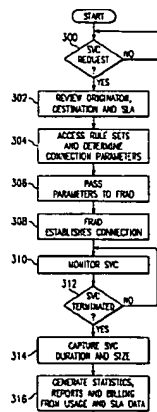
US006549533B1

**(12) United States Patent
Campbell****(10) Patent No.: US 6,549,533 B1
(45) Date of Patent: Apr. 15, 2003****(54) MANAGING SWITCHED VIRTUAL
CIRCUITS IN A NETWORK**6,108,304 A * 8/2000 Abe et al. 370/232
6,275,493 B1 * 8/2001 Morris et al. 370/395
6,343,083 B1 * 1/2002 Menelson et al. 370/466**(75) Inventor: Walter Blanton Campbell, Granite
Bay, CA (US)****OTHER PUBLICATIONS****(73) Assignee: Objective Systems Integrators,
Folsom, CA (US)****"NetExpert® Framework Overview" copyright 1997,
Objective Systems Integrators.**

* cited by examiner

(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 0 days.**Primary Examiner—Wellington Chin****Assistant Examiner—M. Phan****(74) Attorney, Agent, or Firm—Fulbright & Jaworski L.L.P.****(21) Appl. No.: 09/224,567****(57) ABSTRACT****(22) Filed: Dec. 30, 1998****(51) Int. Cl.⁷ H04L 12/26; H04J 3/14;
G08C 15/00; G06F 11/00; G01R 31/08****(52) U.S. Cl. 370/351; 370/232; 370/395;
370/410; 709/236; 709/238****(58) Field of Search 370/351, 218,
370/237, 393, 397, 410, 471, 474, 409;
379/220, 221, 901; 395/200.68, 200.69,
200.2, 200.11****(56) References Cited****U.S. PATENT DOCUMENTS**5,014,262 A * 5/1991 Harshavardhana 370/16
5,016,243 A * 5/1991 Fite, Jr. 370/16
5,023,780 A * 6/1991 Brearley 364/200
5,048,087 A * 9/1991 Trbovich et al. 380/43
5,303,237 A 4/1994 Bergman et al. 370/85.6
5,392,402 A * 2/1995 Robrock, II 395/200
5,416,771 A * 5/1995 Iwata 370/410
5,438,570 A 8/1995 Karras et al. 370/94.2
5,490,141 A * 2/1996 Lai et al. 370/352
5,539,884 A 7/1996 Robrock, II 395/200.12
5,579,480 A * 11/1996 Cidon et al. 395/200.1
5,592,530 A 1/1997 Brockman et al. 379/34
5,638,359 A * 6/1997 Peltola et al. 370/229
5,675,578 A 10/1997 Gruber et al. 370/248
5,712,908 A 1/1998 Peltola et al. 379/119
5,751,698 A * 5/1998 Cushman et al. 370/252
5,781,529 A * 7/1998 Liang et al. 370/218
5,854,899 A * 12/1998 Callon et al. 395/200.68

A system and method for managing switched virtual circuits in a virtual circuit switched network. A preferred embodiment method for managing switched virtual circuits comprises determining that a switched virtual circuit has been established in a virtual circuit switched network by a network access device, monitoring the switched virtual circuit while the switched virtual circuit is active, and storing bandwidth and duration information for the switched virtual circuit upon termination of the switched virtual circuit. Another preferred embodiment method comprises receiving a request for establishing the switched virtual circuit from a network access device, generating connection parameters for establishing the switched virtual circuit in the virtual circuit switched network, and sending a reply including the connection parameters to the network access device. A preferred embodiment network management system comprises a network access device gateway having an interface to a network access device in the virtual circuit switched network, a network administrator database connected to the gateway, the database including rules and objects representing characteristics of the virtual circuit switched network, and a rule engine connected to the gateway and having access to the rules and objects in the database. The present invention enables end users to request and use switched virtual circuits and realize the benefits in cost and efficiency over private virtual circuits, and providing service providers with increased bandwidth utilization and improved profitability.

32 Claims, 2 Drawing Sheets

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L8: Entry 2 of 9

File: USPT

Mar 26, 2002

DOCUMENT-IDENTIFIER: US 6363056 B1

TITLE: Low overhead continuous monitoring of network performance

Brief Summary Text (8):

Consider a network operator with N access points provided to a customer. These access points are intermediaries along the path that a packet takes from the customer network. Performance monitoring of the network operation requires monitoring the N.times.(N-1) simplex channels between the pair-wise access points, and determining performance metrics such as delay between these access points. Another useful metric is the determination of the bandwidth that is being used between the different access points. The bandwidth usage is often a component in the price charged to the customer by the operator.

Current US Cross Reference Classification (1):709/224

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US006363056B1

(12) **United States Patent**
Beigi et al.

(10) **Patent No.:** **US 6,363,056 B1**
(45) **Date of Patent:** **Mar. 26, 2002**

(54) **LOW OVERHEAD CONTINUOUS
MONITORING OF NETWORK
PERFORMANCE**

(75) **Inventors:** **Mandis Sadr Mohammad Beigi**,
Tarrytown; **Raymond Byars Jennings**,
Ossining; **Dinesh Chandra Verma**,
Millwood, all of NY (US)

(73) **Assignee:** **International Business Machines
Corporation**, Armonk, NY (US)

(*) **Notice:** Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 0 days.

(21) **Appl. No.:** **09/115,438**

(22) **Filed:** **Jul. 15, 1998**

(51) **Int. Cl.⁷** **H04L 12/28; H04L 12/56**

(52) **U.S. Cl.** **370/252; 709/224**

(58) **Field of Search** **370/241, 242,**
370/243, 244, 245, 252, 253, 401, 400;
709/224, 235, 223

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,886,643 A * 3/2000 Diebboll et al. 340/825.08
6,058,102 A * 5/2000 Drysdale et al. 370/252
6,108,782 A * 8/2000 Fletcher et al. 713/153

* cited by examiner

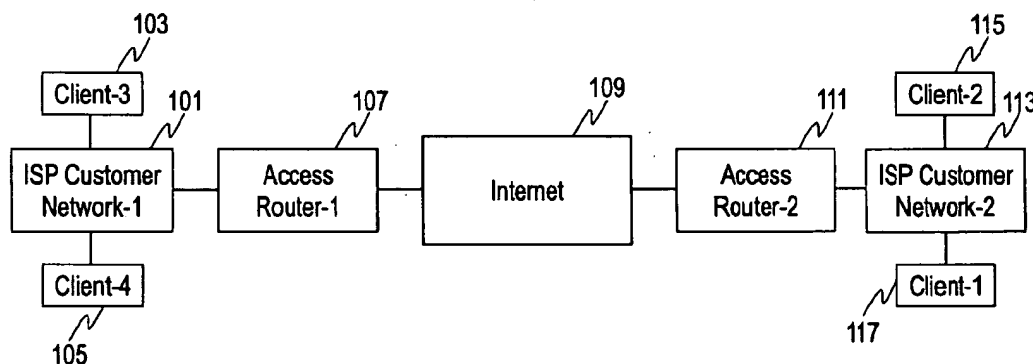
Primary Examiner—Ricky Ngo

(74) *Attorney, Agent, or Firm*—Louis P Herzberg

(57) **ABSTRACT**

A method, apparatus, article of manufacture and computer product for low-overhead continuous monitoring of network performance in an intranet or Internet topology. Probe packets are sent from ingress access routers where they are received and processed by egress access routers. Probe packets are generated by copying every Nth packet being sent by an ingress access router. In the event an access router does not receive the probe packet, the probe packet is discarded through normal network delivery mechanisms. Network delay is determined by subtracting the time that a probe packet was received with the time stamp enclosed in the probe packet. Round trip time is established by reflecting the probe packet back to the originating access router and computing the round trip time. Bandwidth monitoring is achieved by using the number of probe packets received to estimate the expected amount of network traffic to be received. Fault monitoring is accomplished by comparing the number of probe packets received with the number of actual packets received. When the low overhead mechanisms indicate that network delays or faults exist, a heavy weight monitoring protocol is started between two access routers in question.

70 Claims, 12 Drawing Sheets



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L8: Entry 3 of 9

File: USPT

May 29, 2001

DOCUMENT-IDENTIFIER: US 6240402 B1

TITLE: Charge allocation in a multi-user network

Brief Summary Text (5):

Where the network has some means of controlling customer access (access control) to the network then this same mechanism can also be used to monitor, and hence charge for, customers' usage of the network. A network incorporating access control means is shown schematically in FIG. 1. Users access the network designated generally as 1 via one of a plurality of terminals 2 all of which are connected to the network backbone 3. Each terminal 2 accesses the network backbone 3 via a respective access control 4. In the example shown the access control 4 is terminal-specific and can be arranged to record charging data such as call length, call type and/or call duration and ensure that the charge is attributed to the associated terminal 2.

Current US Original Classification (1):705/400

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US006240402B1

(12) **United States Patent**
Lynch-Aird

(10) **Patent No.:** **US 6,240,402 B1**
(45) **Date of Patent:** **May 29, 2001**

(54) **CHARGE ALLOCATION IN A MULTI-USER NETWORK**

(75) **Inventor:** **Nicolas James Lynch-Aird,**
Stowmarket (GB)

(73) **Assignee:** **British Telecommunications public**
limited company, London (GB)

(*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) **Appl. No.:** **09/029,900**

(22) **PCT Filed:** **Mar. 26, 1997**

(86) **PCT No.:** **PCT/GB97/00842**

§ 371 Date: **Mar. 11, 1998**

§ 102(e) Date: **Mar. 11, 1998**

(87) **PCT Pub. No.:** **WO97/37462**

PCT Pub. Date: Oct. 9, 1997

(30) **Foreign Application Priority Data**

Mar. 29, 1996 (GB) 9606622
Jan. 9, 1997 (GB) 9700365

(51) **Int. Cl.⁷** **G06F 17/60**

(52) **U.S. Cl.** **705/400; 379/114**

(58) **Field of Search** **379/111, 114;**
705/1, 30, 34, 52, 53, 59, 400, 418

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,868,758 * 9/1989 Kokubu 705/400
5,265,155 * 11/1993 Castro 379/112
5,406,555 4/1995 Yoshida 370/60
5,440,621 * 8/1995 Castro 379/112
5,745,884 * 4/1998 Carnegie et al. 705/34
5,774,535 * 6/1998 Castro 379/144
5,787,151 * 7/1998 Natatsu et al. 379/88.23

FOREIGN PATENT DOCUMENTS

639 013 2/1995 (EP) .
63-290042 * 11/1988 (JP) .
5-244166 * 9/1993 (JP) .
6-104922 4/1994 (JP) .
7-154387 6/1995 (JP) .
11-119937 * 4/1999 (JP) .

OTHER PUBLICATIONS

Vardy: "Protus to provide fax access over Net: 'Product with potential': People in major Canadian cities can get faxes in e-mail"; Financial Post, Nov. 29, 1999, p. 5.*

* cited by examiner

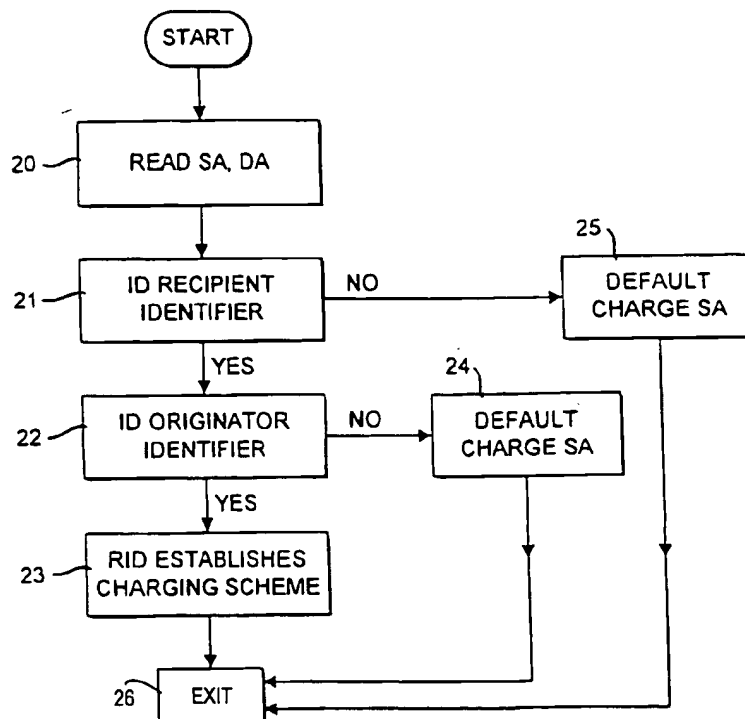
Primary Examiner—Edward R. Cosimano

(74) *Attorney, Agent, or Firm*—Nixon & Vanderhye P.C.

(57) **ABSTRACT**

A communication network includes a communication monitoring point arranged to monitor user identifiers in source/destination identifier fields to determine a charging scheme.

20 Claims, 5 Drawing Sheets



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L8: Entry 4 of 9

File: USPT

Jan 9, 2001

DOCUMENT-IDENTIFIER: US 6173326 B1

TITLE: Broadband communications network services access platform

Brief Summary Text (17):

There have been attempts in the prior art at monitoring data network system usage at the customer's premises to aid in building databases typically used for billing the end-user. One monitoring method, utilized specifically in the television industry, identifies a local oscillator signal and its harmonic radiation and/or propagation which thus identifies the particular frequency being used by the end-user. This method and an apparatus to accomplish the same is disclosed in U.S. Pat. No. 4,723,302 to Fulmer et al., which is incorporated herein by reference. The local oscillator signal, however, is a parasitic effect of a television and essentially an undesired result. Consequently, future televisions will eventually eliminate it, thus rendering such methods of detection obsolete and unusable.

Current US Original Classification (1):709/229Current US Cross Reference Classification (1):709/220Current US Cross Reference Classification (2):709/250

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US006173326B1

(12) **United States Patent**
Collins

(10) **Patent No.:** **US 6,173,326 B1**
(45) **Date of Patent:** **Jan. 9, 2001**

(54) **BROADBAND COMMUNICATIONS
NETWORK SERVICES ACCESS PLATFORM**

(76) **Inventor:** Francis R. Collins, 176 Rangeley Rd.,
Chestnut Hill, MA (US) 02167

(*) **Notice:** Under 35 U.S.C. 154(b), the term of this
patent shall be extended for 0 days.

(21) **Appl. No.:** 09/039,462

(22) **Filed:** Mar. 16, 1998

Related U.S. Application Data

(62) Division of application No. 08/294,490, filed on Aug. 23,
1994, now Pat. No. 5,862,324.

(51) **Int. Cl.**⁷ G06F 15/16

(52) **U.S. Cl.** 709/229; 709/220; 709/250

(58) **Field of Search** 395/200.5, 200.59,
395/200.31; 348/7, 12; 370/257, 364, 352;
709/220, 229, 217

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,803,491	4/1974	Osborn	455/5.1
4,343,042	8/1982	Schrock et al.	455/5.1
4,689,619	8/1987	O'Brien, Jr.	340/825.08
4,723,302	2/1988	Fulmer et al.	455/2
4,752,954	6/1988	Masuko	348/1
4,961,109	10/1990	Tanaka	348/3
5,091,937	2/1992	Kawasaki	455/2

5,093,718	3/1992	Hoarty et al.	348/7
5,208,665	5/1993	McCalley et al.	348/12
5,220,420	6/1993	Hoarty et al.	348/12
5,251,324	10/1993	McMullan, Jr.	455/2
5,278,988	1/1994	Dejean et al.	455/2
5,289,271	2/1994	Watson	348/1
5,361,091	11/1994	Hoarty et al.	348/7
5,414,455	5/1995	Hooper et al.	348/7
5,485,197 *	1/1996	Hoarty	348/7
5,526,034 *	6/1996	Hoarty et al.	348/7
5,659,350 *	8/1997	Hendricks et al.	348/6
5,790,198 *	8/1998	Roop et al.	348/460
5,864,542 *	1/1999	Gupta et al.	370/257

* cited by examiner

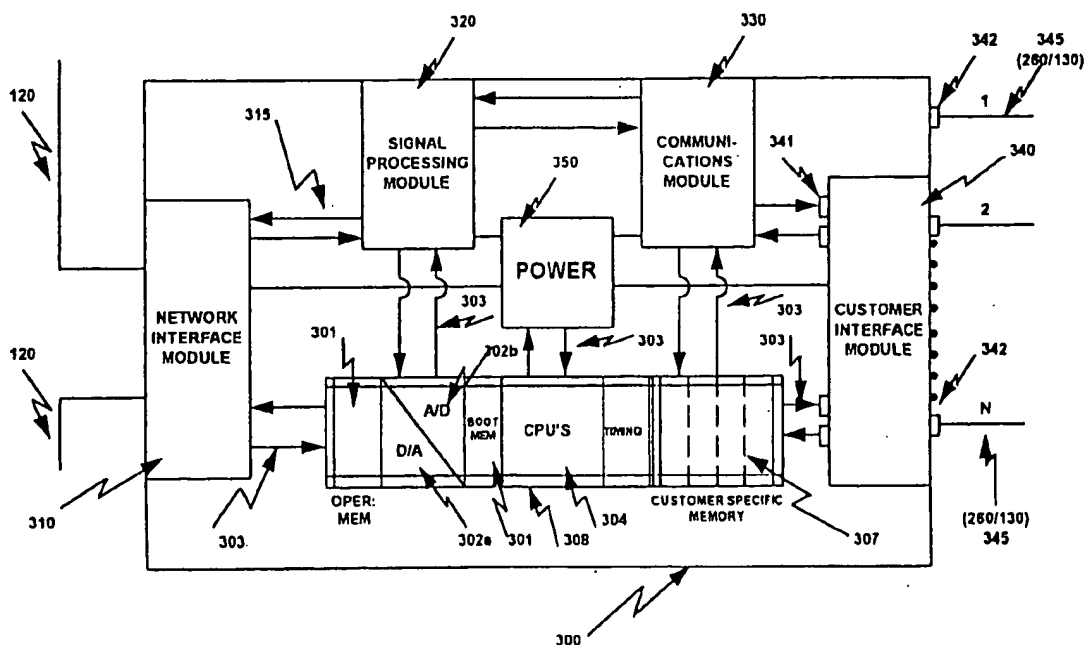
Primary Examiner—Mehmet B. Geckil

(74) *Attorney, Agent, or Firm*—Mirick O'Connell DeMallie
and Lougee, LLP

(57) **ABSTRACT**

A system for controlling access to, service transmission from, and use of an information transmission network which provides an end-user with at will access to the broadband/narrowband service networks deployed in the cable television industry, telephone industry, the multi-media information/services network technology, and the video dial tone industry. Allows the end-user to control the type of services to which such end-user has access to. Network service providers have the ability to provide targeted commercials. Independent interfaced subsystems are combined to yield the network services access system.

32 Claims, 8 Drawing Sheets



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L8: Entry 5 of 9

File: USPT

Aug 31, 1999

DOCUMENT-IDENTIFIER: US 5946302 A

TITLE: System and method for response time measurement in high speed data transmission networks

Brief Summary Text (5):

In many communications environments, billing customers for network usage is important, particularly the ability of a network to respond to a transaction in a timely manner. For example, a workstation could be part of a business where customers come in to make airline reservations. It is important that the reservation request receive a prompt response from a central processing center. Not only is the return information important to the customer, the response time is important to the system operator to provide an efficient dispatching of the requests. Moreover, service agreements between travel agencies and reservation systems require a quality of service and timely network response. A system and method which monitors in real time the response time characteristics of the data processing environment will provide information on the quality of service provided by the network. Also, the information can assist in establishing a better path through the communications network or more efficient dispatching of applications at the host to meet service agreement requirements.

Current US Cross Reference Classification (2):
709/224

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US005946302A

United States Patent [19]

Waclawsky et al.

[11] **Patent Number:** 5,946,302[45] **Date of Patent:** Aug. 31, 1999

[54] **SYSTEM AND METHOD FOR RESPONSE TIME MEASUREMENT IN HIGH SPEED DATA TRANSMISSION NETWORKS**

5,526,488 6/1996 Hershey et al. 395/200.72
5,590,116 12/1996 Zhang 370/252

FOREIGN PATENT DOCUMENTS

[75] **Inventors:** John G. Waclawsky, Frederick, Md.;
Paul C. Hershey, Manassas, Va.

5108026 2/1954 Japan .
3230243 10/1991 Japan .
4130555 5/1992 Japan .
6179341 4/1996 Japan .

[73] **Assignee:** International Business Machines Corporation, Armonk, N.Y.

Primary Examiner—Chi H. Pham
Assistant Examiner—Frank Duong
Attorney, Agent, or Firm—John D. Flynn; Morgan & Finnegan

[21] **Appl. No.:** 09/054,127

[22] **Filed:** Apr. 2, 1998

Related U.S. Application Data

[62] Division of application No. 08/496,622, Jun. 29, 1995, Pat. No. 5,802,302.

[51] **Int. Cl.⁶** G06F 13/00

[52] **U.S. Cl.** 370/252; 370/253; 395/200.54

[58] **Field of Search** 370/252, 253;
395/853, 854, 200.54

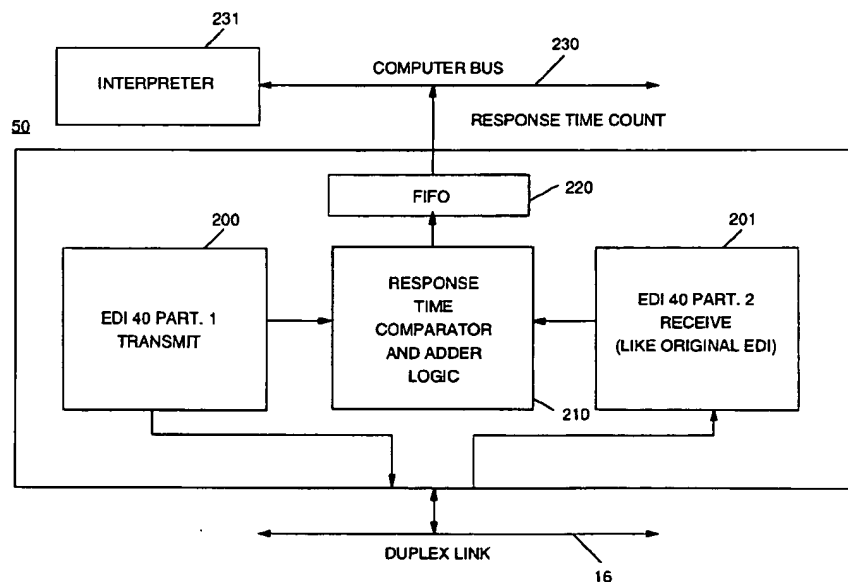
[56] **References Cited**

U.S. PATENT DOCUMENTS

4,817,080	3/1989	Soha	370/252
4,905,171	2/1990	Kiel et al.	364/551.01
5,021,949	6/1991	Morten et al.	364/200
5,095,444	3/1992	Motles	370/13
5,121,345	6/1992	Lentz	364/550
5,138,607	8/1992	Thiebaud et al.	370/13
5,206,888	4/1993	Hiraguchi et al.	364/579
5,226,041	7/1993	Waclawsky et al.	370/60
5,274,815	12/1993	Trissel et al.	395/700
5,274,819	12/1993	Bloomfield-Brown	395/700
5,307,351	4/1994	Webster	370/94.1
5,319,776	6/1994	Hile et al.	395/575
5,343,465	8/1994	Khalil	370/253
5,365,514	11/1994	Hershey et al.	370/241
5,375,070	12/1994	Hershey et al.	364/550

[57] **ABSTRACT**

A high speed data communication network is adapted to monitor and measure response time between a work station and a central host or processor coupled to the data communications network through a media, such as token ring, FDDI, Ethernet, etc. As the workstation communicates with the processor, a flag is set in a packet transmitted to the processor. The packet traverses the network to an application in the processor and a response returns which includes a flag. Each flag is a specific bit pattern. A programmable digital filter recognizes the flags and counts the number of bits on the network between the flags in the forward and reverse direction. By counting the bits on the media, when the flag moves in one direction or another, the total number of bits transmitted on the media between the two intervening flags is determined. The media speed is used as a clock. The number of bits counted divided by the media speed determines the response time with fine resolutions. All of the measurements are done in near real time without the use of clocks or off-line processing of data to determine response time. The measurements can be done for half duplex or full duplex operation of a network. The measurements can be also used in the network to initiate performance changes according to the response time.

5 Claims, 3 Drawing Sheets

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L8: Entry 6 of 9

File: USPT

Jan 19, 1999

DOCUMENT-IDENTIFIER: US 5862324 A

TITLE: Broadband communications network services access platform

Brief Summary Text (17):

There have been attempts in the prior art at monitoring data network system usage at the customer's premises to aid in building databases typically used for billing the end-user. One monitoring method, utilized specifically in the television industry, identifies a local oscillator signal and its harmonic radiation and/or propagation which thus identifies the particular frequency being used by the end-user. This method and an apparatus to accomplish the same is disclosed in U.S. Pat. No. 4,723,302 to Fulmer et al., which is incorporated herein by reference. The local oscillator signal, however, is a parasitic effect of a television and essentially an undesired result. Consequently, future televisions will eventually eliminate it, thus rendering such methods of detection obsolete and unusable.

Current US Original Classification (1):709/220

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US005862324A

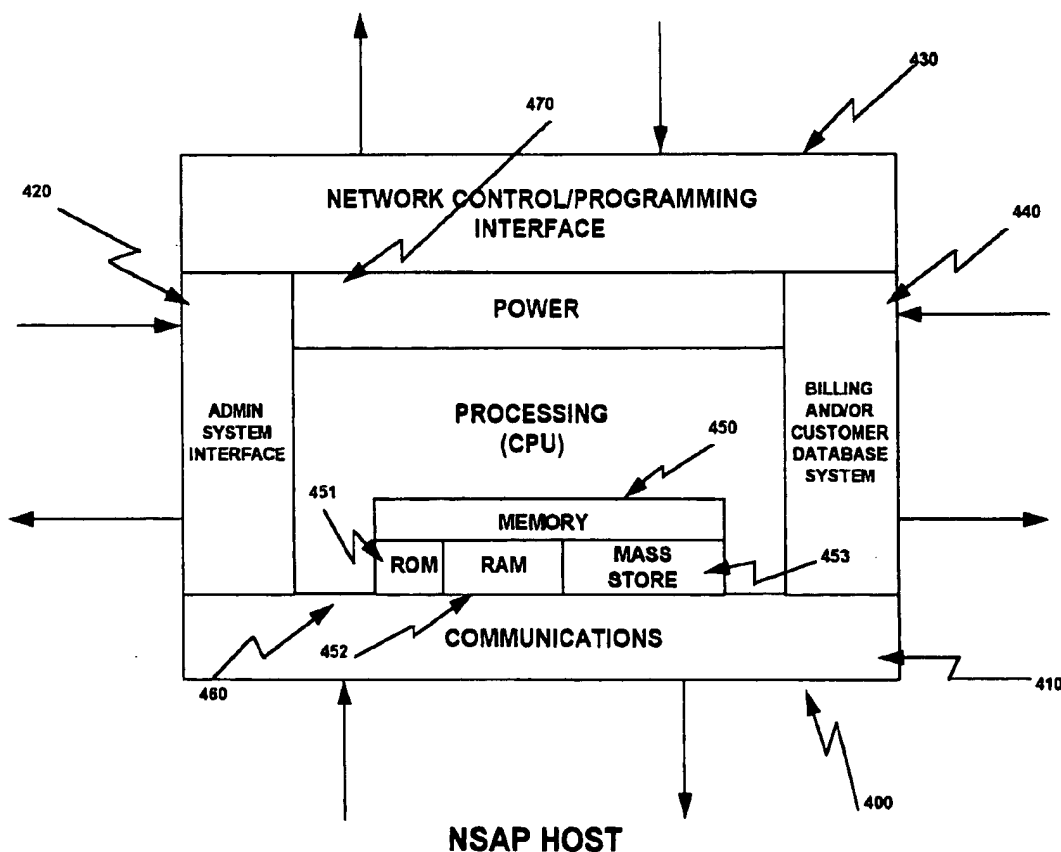
United States Patent [19][11] **Patent Number:** **5,862,324****Collins**[45] **Date of Patent:** **Jan. 19, 1999**[54] **BROADBAND COMMUNICATIONS
NETWORK SERVICES ACCESS PLATFORM**[76] **Inventor:** **Francis R. Collins**, 176 Rangeley Rd.,
Chestnut Hill, Mass. 02167[21] **Appl. No.:** **294,490**[22] **Filed:** **Aug. 23, 1994**[51] **Int. Cl.⁶** **G06F 13/00**[52] **U.S. Cl.** **395/200.5; 348/7; 348/12**[58] **Field of Search** **348/7-12; 395/200.5;
379/93**[56] **References Cited****U.S. PATENT DOCUMENTS**

3,803,491	4/1974	Osborn	455/5.1
4,343,042	8/1982	Schrock et al.	455/5.1
4,689,619	8/1987	O'Brien, Jr.	340/825.08
4,723,302	2/1988	Fulmer et al.	455/2
4,752,954	6/1988	Masuko	348/1
4,961,109	10/1990	Tanaka	348/3
5,091,937	2/1992	Kawasaki	455/2
5,093,718	3/1992	Hoarty et al.	348/7

5,208,665	5/1993	McCalley et al.	348/12
5,220,420	6/1993	Hoarty et al.	348/12
5,251,324	10/1993	McMullan, Jr.	455/2
5,278,988	1/1994	Dejean et al.	455/2
5,289,271	2/1994	Watson	348/1
5,361,091	11/1994	Hoarty et al.	348/7
5,414,455	5/1995	Hooper et al.	348/7

Primary Examiner—Mehmet B. Geckil**Attorney, Agent, or Firm**—Brian M. Dingman[57] **ABSTRACT**

A system for controlling access to, service transmission from, and use of an information transmission network which provides an end-user with at will access to the broadband/narrowband service networks deployed in the cable television industry, telephone industry, the multi-media information/services network technology, and the video dial tone industry. Allows the end-user to control the type of services to which such end-user has access to. Network service providers have the ability to provide targeted commercials. Independent interfaced subsystems are combined to yield the network services access system.

12 Claims, 8 Drawing Sheets

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L8: Entry 7 of 9

File: USPT

Sep 1, 1998

DOCUMENT-IDENTIFIER: US 5802302 A

TITLE: System and method for response time measurement in high speed data transmission networks

Brief Summary Text (5):

In many communications environments, billing customers for network usage is important, particularly the ability of a network to respond to a transaction in a timely manner. For example, a workstation could be part of a business where customers come in to make airline reservations. It is important that the reservation request receive a prompt response from a central processing center. Not only is the return information important to the customer, the response time is important to the system operator to provide an efficient dispatching of the requests. Moreover, service agreements between travel agencies and reservation systems require a quality of service and timely network response. A system and method which monitors in real time the response time characteristics of the data processing environment will provide information on the quality of service provided by the network. Also, the information can assist in establishing a better path through the communications network or more efficient dispatching of applications at the host to meet service agreement requirements.

Current US Original Classification (1):709/224

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US005802302A

United States Patent [19]

Waclawsky et al.

[11] Patent Number: **5,802,302**[45] Date of Patent: **Sep. 1, 1998****[54] SYSTEM AND METHOD FOR RESPONSE TIME MEASUREMENT IN HIGH SPEED DATA TRANSMISSION NETWORKS****[75] Inventors:** John G. Waclawsky, Frederick, Md.;
Paul C. Hershey, Manassas, Va.**[73] Assignee:** International Business Machines Corporation, Armonk, N.Y.**[21] Appl. No.:** 496,622**[22] Filed:** Jun. 29, 1995**[51] Int. Cl.⁶** G06F 13/00; G06F 11/30**[52] U.S. Cl.** 395/200.54; 395/184.01;
370/252; 364/551.01**[58] Field of Search** 364/514 B, 551.01,
364/569; 340/825.65; 370/252, 253; 395/184.01,
200.11, 200.54, 200.64**[56] References Cited****U.S. PATENT DOCUMENTS**

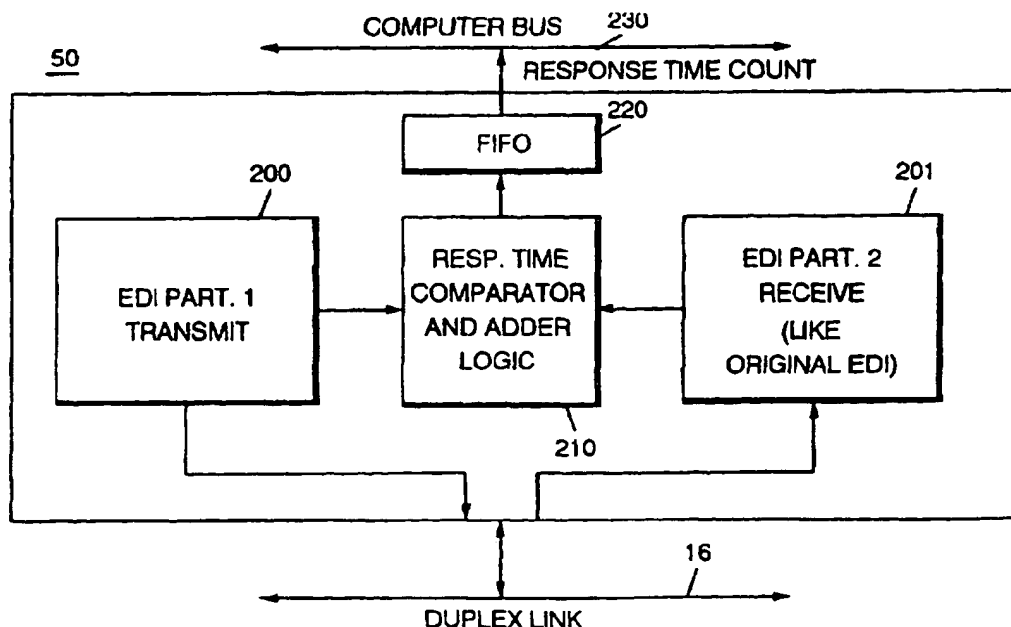
4,905,171	2/1990	Kiel et al.	364/551.01
4,930,093	5/1990	Houser et al.	364/551.01
5,021,949	6/1991	Morten et al.	364/200
5,095,444	3/1992	Motles	370/13
5,121,345	6/1992	Lentz	364/550
5,138,607	8/1992	Thiebaut et al.	370/13
5,206,888	4/1993	Hiraguchi et al.	364/579
5,226,041	7/1993	Waclawsky et al.	370/60
5,274,815	12/1993	Trissel et al.	395/700
5,274,819	12/1993	Bloomfield-Brown	395/700
5,307,351	4/1994	Webster	370/94.1
5,319,776	6/1994	Hile et al.	395/575
5,365,514	11/1994	Hershey et al.	370/17
5,375,070	12/1994	Hershey et al.	364/550
5,615,135	3/1997	Waclawsky et al.	364/514 B

FOREIGN PATENT DOCUMENTS

55-108026	2/1954	Japan
61-79341	4/1986	Japan
3-230243	10/1991	Japan
4-130555	5/1992	Japan

Primary Examiner—Mark H. Rinehart
Attorney, Agent, or Firm—John D. Flynn; Morgan & Finnegan**[57] ABSTRACT**

A high speed data communication network is adapted to monitor and measure response time between a work station and a central host or processor coupled to the data communications network through a media, such as token ring, FDDI, Ethernet, etc. As the workstation communicates with the processor, a flag is set in a packet transmitted to the processor. The packet traverses the network to an application in the processor and a response returns which includes a flag. Each flag is a specific bit pattern. A programmable digital filter recognizes the flags and counts the number of bits on the network between the flags in the forward and reverse direction. By counting the bits on the media, when the flag moves in one direction or another, the total number of bits transmitted on the media between the two intervening flags is determined. The media speed is used as a clock. The number of bits counted divided by the media speed determines the response time with fine resolutions. All of the measurements are done in near real time without the use of clocks or off-line processing of data to determine response time. The measurements can be done for half duplex or full duplex operation of a network. The measurements can be also used in the network to initiate performance changes according to the response time.

13 Claims, 2 Drawing Sheets

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L8: Entry 8 of 9

File: USPT

Sep 17, 1996

DOCUMENT-IDENTIFIER: US 5557746 A

TITLE: System and method for recording accounting times

Brief Summary Text (10):

The Manager is responsible for, among other things, monitoring network performance and status, controlling operational parameters, and reporting, analyzing and isolating faults in its managed domain. Furthermore, the Manager must maintain accounting data of the activity in its managed domain for customer billing, performance analysis, capacity planning and problem determination. In order to effectively accomplish these functions, the Manager requires precise and timely accounting data, including data related to time, regarding the network activity from the nodes in the network. In particular, there are many types of data in which an accurate TIME record is required. For example, in order for a network administrator to accurately bill a customer for the customer's network usage, the network administrator must know the length of time that the customer used the network as well as the time of day (and day of the week), i.e., calendar time, as usage rates may vary accordingly.

Current US Original Classification (1):709/202

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US005557746A

United States Patent [19]

Chen et al.

[11] **Patent Number:** 5,557,746[45] **Date of Patent:** Sep. 17, 1996[54] **SYSTEM AND METHOD FOR RECORDING ACCOUNTING TIMES**[75] Inventors: **David D. Chen, Cary; John L. Eisenbies, Raleigh; William F. McKenzie, Jr., Raleigh; Leo Temoshenko, Raleigh, all of N.C.**[73] Assignee: **International Business Machines Corporation, Armonk, N.Y.**

[21] Appl. No.: 123,547

[22] Filed: Sep. 20, 1993

[51] Int. Cl.⁶ G06F 15/00

[52] U.S. Cl. 395/200.06; 364/222; 364/225.1; 364/249.94; 364/282.1; 364/284.4; 364/DIG. 1

[58] Field of Search 395/200, 200.06; 364/464.01, 464.04; 464/467

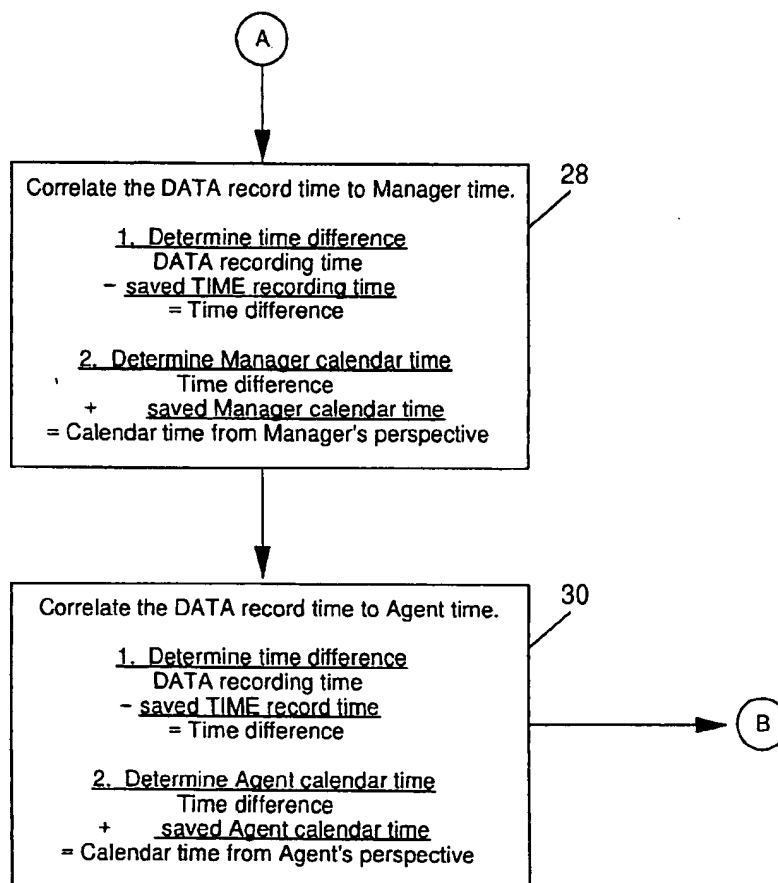
[56] **References Cited****U.S. PATENT DOCUMENTS**

4,355,361 10/1982 Riggs et al. 364/464
 5,003,520 3/1991 Grieu et al. 368/90
 5,237,507 8/1993 Chasck 364/464.04

5,239,576 8/1993 Yoshida et al. 379/355

Primary Examiner—Kevin J. Teska*Assistant Examiner*—Ayni Mohamed*Attorney, Agent, or Firm*—Stephen T. Keohane[57] **ABSTRACT**

A system and method for recording accounting times by an Agent in a network and retrieving the accounting times by the network Manager. Three types of data objects in each of the Agent's stored records are provided. Record Number is the sequence number of the record in the file. Recording time is an indication of the time the record was stored in the file since a certain point in time, such as after the Agent's clock began running. Record Type is the particular type of record stored. The Record Type can either be DATA representing normal accounting data or TIME representing time data used for correlating the Manager's and the Agent's time-keeping. Upon receipt of an accounting data record of type DATA, the manager uses the record's Recording time to help determine the point of time accorded to that event. The Manager then uses the previous record of type TIME to adjust the Recording time of the received accounting data record relative to the Manager's precise calendar time.

23 Claims, 7 Drawing Sheets

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L8: Entry 9 of 9

File: USPT

Mar 23, 1993

DOCUMENT-IDENTIFIER: US 5197002 A

TITLE: Methods and apparatus for dynamic hashing

Detailed Description Text (3):

Suppl
If the data packet transmission network of FIG. 1 is provided by a common carrier, or if shared use of the network is contemplated, then it is necessary to assign the costs of building and maintaining the network to a plurality of users in some way which is considered fair and reasonable to those users. One such method of assigning costs is called usage sensitive billing. In usage sensitive billing, each user is monitored to determine how much use that user makes of the network, and the user is ~~then~~ billed proportionally to that usage. The normal elements of usage are the number of message packets delivered by the network, the length of those delivered message packets, and the length of the route over which the delivered message packets must travel in order to reach the desired destination. If each of the packet switches of network 14 creates a billing record when packets are delivered, and if that billing record includes the source address, the destination address and a count of the number of packets delivered, then usage sensitive billing records can be constructed from those billing records. The format of a typical billing record is shown in FIG. 2. In FIG. 1, it is assumed that the one of packet switches 10-13 which is connected to the destination station generates the billing record after delivering the message packet to the proper destination. All of these billing records are delivered to a common billing system 19 where usage charges can be accumulated for each of the customers of the network 14. A single billing record, or a plurality of such billing records, can be formatted as a standard message packet and launched on the packet switching network 14 of FIG. 1 with a destination of billing system 19. Alternatively, if the billing message packets might overload the capacity of the switching network 14, these billing records can be delivered to billing system 19 by separate dedicated transmission facilities. In any event, a very large number of billing records are delivered to billing system 19, which records must be processed in real time without loss of any records. Techniques for the rapid processing of large numbers of records in real time is the subject matter of this invention.

Current US Original Classification (1):

705/34

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US005197002A

United States Patent [19][11] **Patent Number:** **5,197,002****Spencer**[45] **Date of Patent:** **Mar. 23, 1993****[54] METHODS AND APPARATUS FOR DYNAMIC HASHING****[75] Inventor:** Paul A. Spencer, Highland Park, N.J.**[73] Assignee:** Bell Communications Research, Inc.,
Livingston, N.J.**[21] Appl. No.:** 455,264**[22] Filed:** Dec. 22, 1989**[51] Int. Cl.:** G06F 15/21; G06F 15/40**[52] U.S. Cl.:** 364/406; 395/400;
395/425; 395/600**[58] Field of Search:** 364/401, 406, 408;
395/400, 425, 20, 600**[56] References Cited****U.S. PATENT DOCUMENTS**

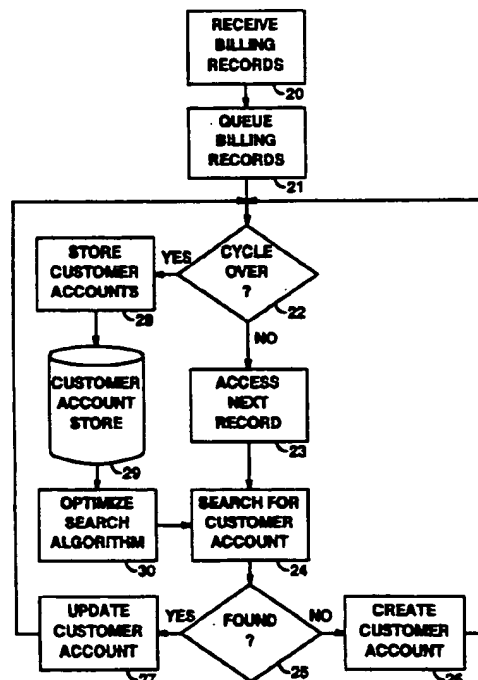
4,370,711	1/1983	Smith	364/200
4,730,348	3/1988	MacCracken	375/122
5,032,987	7/1991	Broder et al.	364/200

OTHER PUBLICATIONS*Information Systems*, vol. 13, No. 1, Hsiao et al. "Adaptive Hashing", pp. 111-127, (abstract only).*Avtomatika i Vychislitel'naya Tekhnika*, No. 3, Blank et al. "Adaptive algorithm for an information search", pp. 62-66 (abstract only).*Standard Dictionary of Computers and Information Processing*, Weik, Hayden Book Company, Inc., 1977, p. 259.*Kibernetika*, vol. 21, No. 5, Driyanskii et al., "Algo-

rithms for Computing Estimates in Document Retrieval Systems", pp. 708-715 (abstract only).

Proceedings of Joint BCS and ACM Symposium, Cambridge Pub., Croft et al., "The use of adaptive mechanisms for selection of search strategies in document retrieval systems", pp. 95-110 (abstract only).*The Art of Computer Programming* vol. 3, Sorting and Searching pp. 506-549, Addison-Wesley, Reading, Massachusetts, 1973.**Primary Examiner**—Roy N. Envall, Jr.**Assistant Examiner**—David Huntley**Attorney, Agent, or Firm**—Leonard Charles Suchyta;
James W. Falk**[57]****ABSTRACT**

A system is disclosed for processing billing records in a data packet transmission network by optimizing the search algorithm for accessing customer records. Using hashing techniques, the hashing parameters of hashing key and modulus base of the modulo arithmetic are varied to optimize the hashing function for recently received billing records. These optimum parameters are then used predictively to hash the next batch of billing records. In a preferred embodiment, the billing records are queued in two ping-pong memories and the contents of one are used to drive the optimizer while the contents of the other are used to drive the billing procedure.

6 Claims, 5 Drawing Sheets**BILLING PROCEDURE**

Freeform Search

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Term:	<div style="border: 1px solid black; padding: 2px;"> L1 and (analyz\$ with network\$ with (volume or flow\$ or traffic\$)).ab. </div>
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DATE: Friday, May 27, 2005 [Printable Copy](#) [Create Case](#)

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side by side

Hit Count Set Name

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DB=USPT; PLUR=YES; OP=ADJ

<u>L4</u>	L1 and (analyz\$ with network\$ with (volume or flow\$ or traffic\$)).ab.	19	<u>L4</u>
<u>L3</u>	L1 and (analyz\$ with network\$ with (volume or flow\$)).ab.	5	<u>L3</u>
<u>L2</u>	L1 and (analyz\$ with network\$ with (volume or flow\$))	85	<u>L2</u>
<u>L1</u>	(709/\$.cccls.)	17919	<u>L1</u>

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L4: Entry 1 of 19

File: USPT

May 17, 2005

DOCUMENT-IDENTIFIER: US 6895438 B1

TITLE: Telecommunication-based time-management system and method

Abstract Text (1):

A proxy-server system (15) connected preferably to a computer-telephone system (10) intercepts, processes, and analyzes as traffic-analysis results (68A-C) all forms of real- and non-real-time electronic communication passing over the network in the form of raw traffic data (61). The proxy-server system normalizes each communication into the measure of time needed by recipient(s) of the communication to understand the information contained therein. Once normalized, the data may be aggregated into summary reports (69A-C). As part of the analysis, the aggregated communication records are compared with user-defined rules to provide alerts if the individual or aggregated durations exceed boundaries set by the rules. In one embodiment, the summary reports may be integrated with general-ledger data (94) and other raw business data (74) via a relational database (72) to derive more accurate records of activity-based-costing information (76). Additionally, the data of the summary reports may be visualized in two- or three-dimensional representations of communication-flow patterns to illustrate in an intuitive and semantically scalable manner the desired level of detail for time and time-based expense consumed by the electronic interactions of an individual or organization.

Current US Original Classification (1):

709/227

Current US Cross Reference Classification (13):

709/219

Current US Cross Reference Classification (14):

709/232

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US006895438B1

(12) **United States Patent**
Ulrich

(10) **Patent No.:** US 6,895,438 B1
(45) **Date of Patent:** May 17, 2005

(54) **TELECOMMUNICATION-BASED
TIME-MANAGEMENT SYSTEM AND
METHOD**

5,966,139 A 10/1999 Anupam et al. 345/440
5,987,516 A 11/1999 Rao et al. 709/227
5,991,365 A 11/1999 Pizano et al. 379/88.13

(Continued)

(75) **Inventor:** Paul C. Ulrich, 355 The Promenade,
Edgewater, NJ (US) 07020

(73) **Assignee:** Paul C. Ulrich, Southbury, CT (US)

(*) **Notice:** Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 822 days.

(21) **Appl. No.:** 09/655,681

(22) **Filed:** Sep. 6, 2000

(51) **Int. Cl.⁷** G06F 15/16

(52) **U.S. Cl.** 709/227; 709/219; 709/232;
707/1; 707/3; 707/6; 705/9; 704/201; 704/503;
455/66.1; 455/186.1; 455/566; 370/521;
370/522; 370/535; 345/716

(58) **Field of Search** 709/219, 232,
709/204, 224, 227, 233; 707/1, 3, 6; 705/9;
704/201, 503; 455/66.1, 186.1, 566; 370/521,
522, 535, 328; 345/716; 379/120; 719/329;
235/382

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,418,951 A 5/1995 Damashek 395/600
5,708,780 A 1/1998 Levergood et al. 395/200.12
5,748,620 A * 5/1998 Capurka 370/328
5,799,286 A 8/1998 Morgan et al. 705/30
5,812,780 A * 9/1998 Chen et al. 709/224
5,850,388 A 12/1998 Anderson et al. 370/252
5,889,943 A 3/1999 Ji et al. 395/187.01
5,909,493 A 6/1999 Motoyama 380/25
5,909,672 A 6/1999 Madore et al. 705/32
5,913,041 A * 6/1999 Ramanathan et al. 709/233
5,917,489 A 6/1999 Thurlow et al. 345/347
5,925,101 A 7/1999 Bayless et al. 709/219
5,951,642 A 9/1999 Onoe et al. 709/224
5,963,912 A 10/1999 Katz 705/7

FOREIGN PATENT DOCUMENTS

WO WO98/38614 9/1998
WO WO99/65216 12/1999
WO WO00/17727 3/2000
WO WO00/17761 3/2000
WO WO00/17781 3/2000
WO WO00/17782 3/2000
WO WO00/17784 3/2000
WO WO00/17785 3/2000

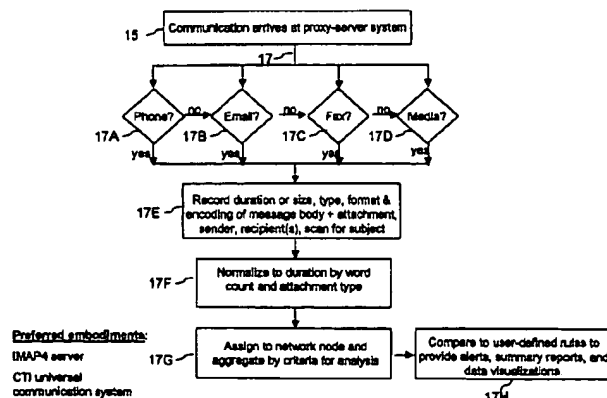
Primary Examiner—Jack Harvey

Assistant Examiner—Hai V. Nguyen

(57) **ABSTRACT**

A proxy-server system (15) connected preferably to a computer-telephone system (10) intercepts, processes, and analyzes as traffic-analysis results (68A–C) all forms of real- and non-real-time electronic communication passing over the network in the form of raw traffic data (61). The proxy-server system normalizes each communication into the measure of time needed by recipient(s) of the communication to understand the information contained therein. Once normalized, the data may be aggregated into summary reports (69A–C). As part of the analysis, the aggregated communication records are compared with user-defined rules to provide alerts if the individual or aggregated durations exceed boundaries set by the rules. In one embodiment, the summary reports may be integrated with general-ledger data (94) and other raw business data (74) via a relational database (72) to derive more accurate records of activity-based-costing information (76). Additionally, the data of the summary reports may be visualized in two- or three-dimensional representations of communication-flow patterns to illustrate in an intuitive and semantically scalable manner the desired level of detail for time and time-based expense consumed by the electronic interactions of an individual or organization.

24 Claims, 15 Drawing Sheets



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L4: Entry 2 of 19

File: USPT

Jan 4, 2005

DOCUMENT-IDENTIFIER: US 6839751 B1

**** See image for Certificate of Correction ****

TITLE: Re-using information from data transactions for maintaining statistics in network monitoring

Abstract Text (1):

A method of and monitor apparatus for analyzing a flow of packets passing through a connection point on a computer network. The method includes receiving a packet from a packet acquisition device, and looking up a flow-entry database containing flow-entries for previously encountered conversational flows. The looking up to determine if the received packet is of an existing flow. Each and every packet is processed. If the packet is of an existing flow, the method updates the flow-entry of the existing flow, including storing one or more statistical measures kept in the flow-entry. If the packet is of a new flow, the method stores a new flow-entry for the new flow in the flow-entry database, including storing one or more statistical measures kept in the flow-entry. The statistical measures are used to determine metrics related to the flow. The metrics may be base metrics from which quality of service metrics are determined, or may be the quality of service metrics.

Current US Original Classification (1):
709/224

Current US Cross Reference Classification (1):
709/223

Current US Cross Reference Classification (2):
709/230

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US006839751B1

(12) **United States Patent**
Dietz et al.

(10) **Patent No.:** **US 6,839,751 B1**
(45) **Date of Patent:** **Jan. 4, 2005**

(54) **RE-USING INFORMATION FROM DATA
TRANSACTIONS FOR MAINTAINING
STATISTICS IN NETWORK MONITORING**

(75) **Inventors:** **Russell S. Dietz, San Jose, CA (US);
Joseph R. Malxner, Aptos, CA (US);
Andrew A. Koppenhaver, Littleton,
CO (US)**

(73) **Assignee:** **Hi/fn, Inc., Los Gatos, CA (US)**

(*) **Notice:** Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 728 days.

(21) **Appl. No.:** **09/608,126**

(22) **Filed:** **Jun. 30, 2000**

Related U.S. Application Data

(60) **Provisional application No. 60/141,903, filed on Jun. 30,
1999.**

(51) **Int. Cl.⁷** **G06F 15/173**

(52) **U.S. Cl.** **709/224; 709/223; 709/230**

(58) **Field of Search** **709/223, 224,
709/231, 232, 230; 370/252, 231; 379/32;
704/43; 714/39; 340/825**

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,972,453 A	*	11/1990	Daniel et al.	379/9.03
5,535,338 A	*	7/1996	Krause et al.	709/222
5,703,877 A	*	12/1997	Nuber et al.	370/395
5,720,032 A	*	2/1998	Picazo, Jr. et al.	709/250
5,761,429 A	*	6/1998	Thompson	709/224
5,799,154 A	*	8/1998	Kuriyan	709/223
5,802,054 A	*	9/1998	Bellenger	370/401
5,850,388 A	*	12/1998	Anderson et al.	370/252
5,892,754 A	*	4/1999	Kompella et al.	370/236
6,097,699 A	*	8/2000	Chen et al.	370/231
6,115,393 A	*	9/2000	Engel et al.	370/469
6,269,330 B1	*	7/2001	Cidon et al.	704/43
6,279,113 B1	*	8/2001	Vaidya	713/201
6,282,570 B1	*	8/2001	Leung et al.	709/224

6,330,226 B1	*	12/2001	Chapman et al.	370/232
6,363,056 B1	*	3/2002	Beigi et al.	370/252
6,381,306 B1	*	4/2002	Lawson et al.	379/32
6,424,624 B1	*	7/2002	Galand et al.	370/231
6,453,345 B2	*	9/2002	Trcka et al.	709/224
6,625,657 B1	*	9/2003	Bullard	709/237
6,651,099 B1	*	11/2003	Dietz et al.	709/224

OTHER PUBLICATIONS

NOV94: Packet Filtering in the SNMP Remote Monitor ;
www.skrymir.com/dobbs/articles/1994/9411/9411h/
9411h.htm.*

GTrace—A Graphical Traceroute Tool authored by Ram
Periakaruppan, Evi Nemeth ; <http://www.caida.org/out-reach/papers/1999/GTrace/index.xml>.*

Advanced Methods for Storage and Retrieval in Image ;
<http://www.cs.tulane.edu/www/Prototype/proposal.html>;
1998.*

Measurement and analysis of the digital DECT propagation
channel; IEEE 1998.*

* cited by examiner

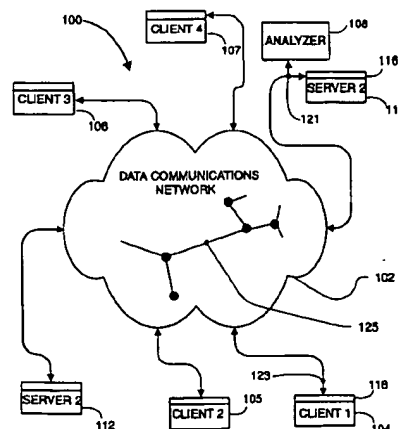
Primary Examiner—Thong Vu

(74) *Attorney, Agent, or Firm*—Dov Rosenfeld; Inventek

(57) **ABSTRACT**

A method of and monitor apparatus for analyzing a flow of packets passing through a connection point on a computer network. The method includes receiving a packet from a packet acquisition device, and looking up a flow-entry database containing flow-entries for previously encountered conversational flows. The looking up to determine if the received packet is of an existing flow. Each and every packet is processed. If the packet is of an existing flow, the method updates the flow-entry of the existing flow, including storing one or more statistical measures kept in the flow-entry. If the packet is of a new flow, the method stores a new flow-entry for the new flow in the flow-entry database, including storing one or more statistical measures kept in the flow-entry. The statistical measures are used to determine metrics related to the flow. The metrics may be base metrics from which quality of service metrics are determined, or may be the quality of service metrics.

21 Claims, 18 Drawing Sheets



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L4: Entry 3 of 19

File: USPT

Dec 7, 2004

DOCUMENT-IDENTIFIER: US 6829643 B1

TITLE: Network control apparatus having bandwidth control method selection associated to users utilizing status tables, ranking tables, and total points of user's information parameters

Abstract Text (1):

In a network control apparatus which can dynamically control a bandwidth corresponding to a traffic status of a user flexibly, when a whole traffic quantity of a packet passing through the network exceeds a threshold value, per-user-information is analyzed based on a database holding packet information, and a bandwidth control method in conformity with the result of the analysis is selected to perform/release the bandwidth control.

Current US Original Classification (1):709/226Current US Cross Reference Classification (1):709/224Current US Cross Reference Classification (2):709/225Current US Cross Reference Classification (3):709/229Current US Cross Reference Classification (4):709/235

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US006829643B1

(12) **United States Patent**
Tobe et al.

(10) **Patent No.:** US 6,829,643 B1
(45) **Date of Patent:** Dec. 7, 2004

(54) **NETWORK CONTROL APPARATUS HAVING BANDWIDTH CONTROL METHOD SELECTION ASSOCIATED TO USERS UTILIZING STATUS TABLES, RANKING TABLES, AND TOTAL POINTS OF USER'S INFORMATION PARAMETERS**

(75) **Inventors:** Teruo Tobe, Kawasaki (JP); Hitoshi Ohura, Kawasaki (JP); Yoshiki Suzuki, Kawasaki (JP); Kazuhiko Yanagidate, Kawasaki (JP); Hiroshi Kobayashi, Yokohama (JP)

(73) **Assignee:** Fujitsu Limited, Kawasaki (JP)

(*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 753 days.

(21) **Appl. No.:** 09/716,775

(22) **Filed:** Nov. 20, 2000

(30) **Foreign Application Priority Data**

Feb. 1, 2000 (JP) 2000-024128

(51) **Int. Cl.⁷** G06F 15/173

(52) **U.S. Cl.** 709/226; 709/224; 709/225; 709/229; 709/235

(58) **Field of Search** 709/200-310

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,424,624 B1	•	7/2002	Galand et al.	370/231
6,625,643 B1	•	9/2003	Colby et al.	709/217
2001/0003830 A1	•	6/2001	Nielsen	709/226

FOREIGN PATENT DOCUMENTS

JP	08079305	3/1996
JP	09200270	7/1997
JP	11122279	4/1999

* cited by examiner

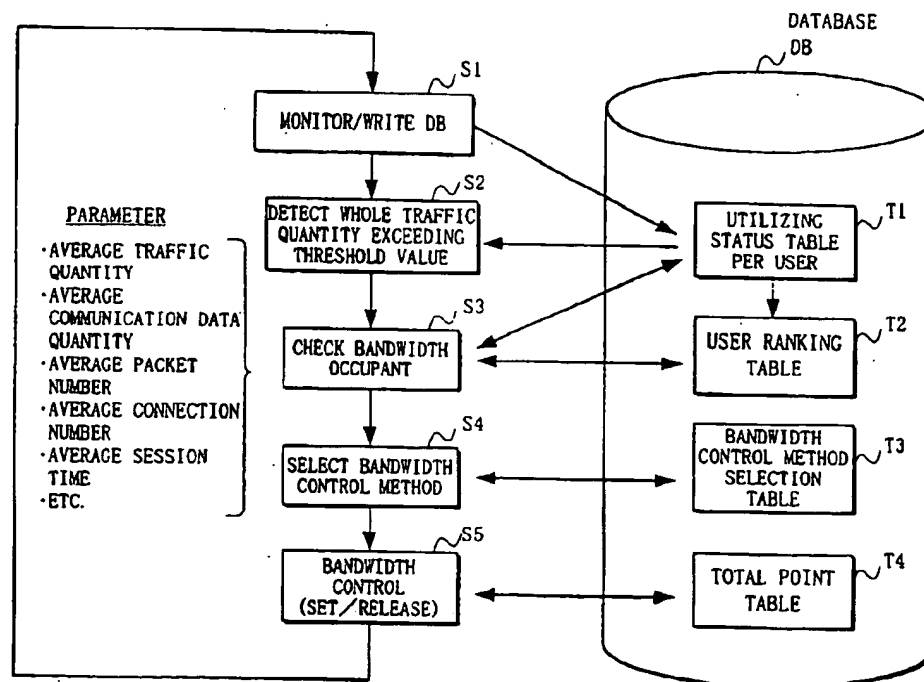
Primary Examiner—Nabil El-Hady

(74) *Attorney, Agent, or Firm*—Katten Muchin Zavis Rosenman

(57) **ABSTRACT**

In a network control apparatus which can dynamically control a bandwidth corresponding to a traffic status of a user flexibly, when a whole traffic quantity of a packet passing through the network exceeds a threshold value, per-user-information is analyzed based on a database holding packet information, and a bandwidth control method in conformity with the result of the analysis is selected to perform/release the bandwidth control.

7 Claims, 6 Drawing Sheets



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L4: Entry 4 of 19

File: USPT

Nov 30, 2004

DOCUMENT-IDENTIFIER: US 6826611 B1

TITLE: Apparatus and method for automatically obtaining a valid IP configuration in a local area network

Abstract Text (1):

A apparatus and method for automatically determining a valid IP configuration on a network analyzes traffic and determines valid subnets. A likely unused start IP address in a subnet is selected and checked to determine its availability. If not available, the start address is decremented, and tested again, until a valid address is obtained.

Current US Original Classification (1):709/226Current US Cross Reference Classification (7):709/200Current US Cross Reference Classification (8):709/222

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US006826611B1

(12) **United States Patent**
Arndt

(10) **Patent No.:** **US 6,826,611 B1**
(45) **Date of Patent:** **Nov. 30, 2004**

(54) **APPARATUS AND METHOD FOR
AUTOMATICALLY OBTAINING A VALID IP
CONFIGURATION IN A LOCAL AREA
NETWORK**

(75) **Inventor:** **Manfred R. Arndt, Folsom, CA (US)**

(73) **Assignee:** **Fluke Corporation, Everett, WA (US)**

(*) **Notice:** Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 641 days.

5,854,901 A	12/1998	Cole et al.	709/245
5,918,016 A	* 6/1999	Brewer et al.	709/220
5,974,547 A	* 10/1999	Klimenko	709/220
6,097,727 A	* 8/2000	Peters	370/400
6,101,499 A	* 8/2000	Ford et al.	707/10
6,345,294 B1	* 2/2002	O'Toole et al.	709/222
6,601,093 B1	* 7/2003	Peters	709/220

FOREIGN PATENT DOCUMENTS

WO 00/63779 10/2000

* cited by examiner

(21) **Appl. No.:** **09/676,631**

(22) **Filed:** **Sep. 30, 2000**

(51) **Int. Cl.⁷** **G06F 15/173**

(52) **U.S. Cl.** **709/226; 709/200; 709/222;
707/10; 702/186; 702/188; 370/252; 370/253;
370/400**

(58) **Field of Search** **709/200, 222,
709/226; 707/10; 370/400, 252, 253; 702/186,
188**

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,724,510 A 3/1998 Arndt et al. 709/220

Primary Examiner—Jack B. Harvey

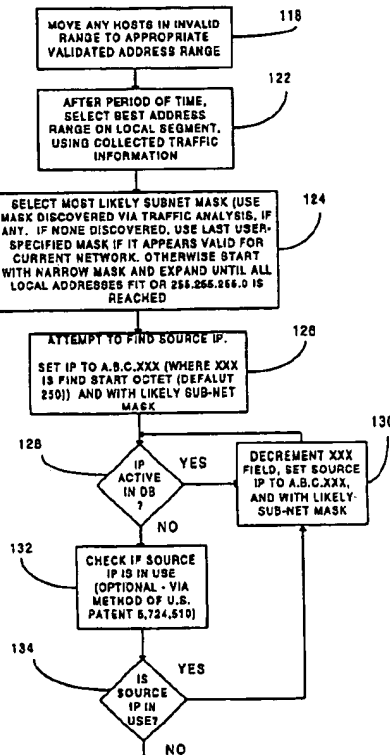
Assistant Examiner—Hai V. Nguyen

(74) *Attorney, Agent, or Firm*—Delleit & Walters

(57) **ABSTRACT**

A apparatus and method for automatically determining a valid IP configuration on a network analyzes traffic and determines valid subnets. A likely unused start IP address in a subnet is selected and checked to determine its availability. If not available, the start address is decremented, and tested again, until a valid address is obtained.

20 Claims, 6 Drawing Sheets



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L4: Entry 5 of 19

File: USPT

May 11, 2004

DOCUMENT-IDENTIFIER: US 6735629 B1

TITLE: Method and apparatus for real-time protocol analysis using an active and adaptive auto-throttling CPU allocation front end process

Abstract Text (1):

In a probe system for monitoring and analyzing data flow and associated activities between devices connected in common to a point in a network, in the mode of operation, the probe's driver runs in a "Kernel mode" on Windows NT for analyzing in relatively low detail packets of data retrieved from the network, whereby programming is provided for operating the Kernel mode driver to monitor the rate of traffic or data packets entering an NIC card buffer, for causing the CPU to respond to an interrupt issued by the NIC everytime a data packet is received at a traffic rate below a predetermined threshold to access data packets entering the NIC card buffer, and to cause the CPU to respond to polling pulses at regular predetermined intervals to access data packets, when the traffic rate exceeds the predetermined threshold, for providing more CPU cycles to analyze the data packets. In another mode of operation, unanalyzed data packets are transferred to a frame memory for relatively detailed analysis via Expert Analyzer software operating the CPU in a User mode, whereby the amount of unanalyzed data in the frame memory is monitored for allocating the percent of CPU time available for Kernel mode processing in inverse relationship thereto.

Current US Original Classification (1):

709/224

Current US Cross Reference Classification (1):

709/223

Current US Cross Reference Classification (2):

709/228

Current US Cross Reference Classification (3):

709/233

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US006735629B1

(12) **United States Patent**
Cafarelli, III et al.

(10) Patent No.: **US 6,735,629 B1**
(45) Date of Patent: **May 11, 2004**

(54) **METHOD AND APPARATUS FOR REAL-TIME PROTOCOL ANALYSIS USING AN ACTIVE AND ADAPTIVE AUTO-THROTTLING CPU ALLOCATION FRONT END PROCESS**

(75) Inventors: **Dominick Anthony Cafarelli, III**, Ossining, NY (US); **Daniel Hansen**, Pompton Plains, NJ (US)

(73) Assignee: **Networks Associates Technology, Inc.**, Santa Clara, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/565,021**

(22) Filed: **May 4, 2000**

(51) Int. Cl.⁷ **G06F 15/173; G06F 15/16**

(52) U.S. Cl. **709/224; 709/233; 709/228; 709/223**

(58) Field of Search **709/220, 223, 709/234-236, 249, 201, 209, 225, 233**

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,740,380 A * 4/1998 LaBerge et al. 710/107
5,845,074 A * 12/1998 Kobata 709/219
5,966,381 A 10/1999 Buckley et al. 370/395

* cited by examiner

Primary Examiner—Ario Etienne

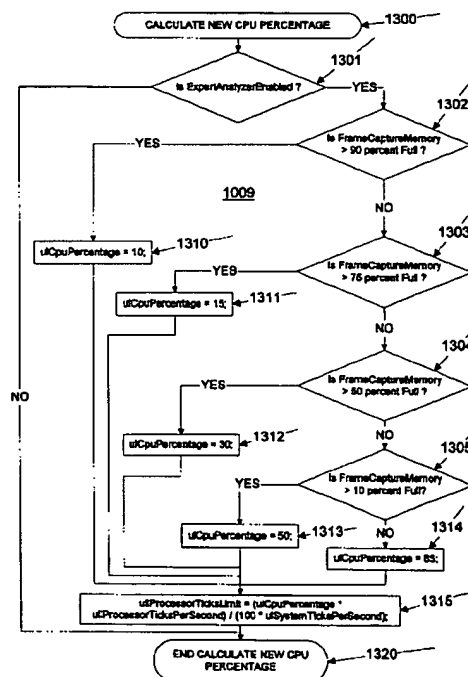
Assistant Examiner—Hussein Chanti

(74) *Attorney, Agent, or Firm*—Silicon Valley IP Group, PC; Kevin J. Zilka; Christopher J. Hamaty

(57) **ABSTRACT**

In a probe system for monitoring and analyzing data flow and associated activities between devices connected in common to a point in a network, in the mode of operation, the probe's driver runs in a "Kernel mode" on Windows NT for analyzing in relatively low detail packets of data retrieved from the network, whereby programming is provided for operating the Kernel mode driver to monitor the rate of traffic or data packets entering an NIC card buffer, for causing the CPU to respond to an interrupt issued by the NIC everytime a data packet is received at a traffic rate below a predetermined threshold to access data packets entering the NIC card buffer, and to cause the CPU to respond to polling pulses at regular predetermined intervals to access data packets, when the traffic rate exceeds the predetermined threshold, for providing more CPU cycles to analyze the data packets. In another mode of operation, unanalyzed data packets are transferred to a frame memory for relatively detailed analysis via Expert Analyzer software operating the CPU in a User mode, whereby the amount of unanalyzed data in the frame memory is monitored for allocating the percent of CPU time available for Kernel mode processing in inverse relationship thereto.

30 Claims, 14 Drawing Sheets



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L4: Entry 5 of 19

File: USPT

May 11, 2004

DOCUMENT-IDENTIFIER: US 6735629 B1

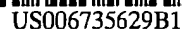
TITLE: Method and apparatus for real-time protocol analysis using an active and adaptive auto-throttling CPU allocation front end process

Abstract Text (1):

In a probe system for monitoring and analyzing data flow and associated activities between devices connected in common to a point in a network, in the mode of operation, the probe's driver runs in a "Kernel mode" on Windows NT for analyzing in relatively low detail packets of data retrieved from the network, whereby programming is provided for operating the Kernel mode driver to monitor the rate of traffic or data packets entering an NIC card buffer, for causing the CPU to respond to an interrupt issued by the NIC everytime a data packet is received at a traffic rate below a predetermined threshold to access data packets entering the NIC card buffer, and to cause the CPU to respond to polling pulses at regular predetermined intervals to access data packets, when the traffic rate exceeds the predetermined threshold, for providing more CPU cycles to analyze the data packets. In another mode of operation, unanalyzed data packets are transferred to a frame memory for relatively detailed analysis via Expert Analyzer software operating the CPU in a User mode, whereby the amount of unanalyzed data in the frame memory is monitored for allocating the percent of CPU time available for Kernel mode processing in inverse relationship thereto.

Current US Original Classification (1):709/224Current US Cross Reference Classification (1):709/223Current US Cross Reference Classification (2):709/228Current US Cross Reference Classification (3):709/233

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(10) **Patent No.:** **US 6,735,629 B1**
(45) **Date of Patent:** **May 11, 2004**

- Primary Examiner*—Ario Etienne
Assistant Examiner—Hussein Chanti
(74) *Attorney, Agent, or Firm*—Silicon Valley IP Group,
PC; Kevin J. Zilka; Christopher J. Hamaty

- (57)
- ABSTRACT**

- In a probe system for monitoring and analyzing data flow and associated activities between devices connected in common to a point in a network, in the mode of operation, the probe's driver runs in a "Kernel mode" on Windows NT for analyzing in relatively low detail packets of data retrieved from the network, whereby programming is provided for operating the Kernel mode driver to monitor the rate of traffic or data packets entering an NIC card buffer, for causing the CPU to respond to an interrupt issued by the NIC everytime a data packet is received at a traffic rate below a predetermined threshold to access data packets entering the NIC card buffer, and to cause the CPU to respond to polling pulses at regular predetermined intervals to access data packets, when the traffic rate exceeds the predetermined threshold, for providing more CPU cycles to analyze the data packets. In another mode of operation, unanalyzed data packets are transferred to a frame memory for relatively detailed analysis via Expert Analyzer software operating the CPU in a User mode, whereby the amount of unanalyzed data in the frame memory is monitored for allocating the percent of CPU time available for Kernel mode processing in inverse relationship thereto.

- (21) Appl. No.: 09/565,021

- (22) Filed: May 4, 2000

- (51) **Int. Cl.⁷** **G06F 15/173; G06F 15/16**

- (52) U.S. Cl. 709/224; 709/233; 709/228;
709/223

- (58) **Field of Search** 709/220, 223,
709/234-236, 249, 201, 209, 225, 233

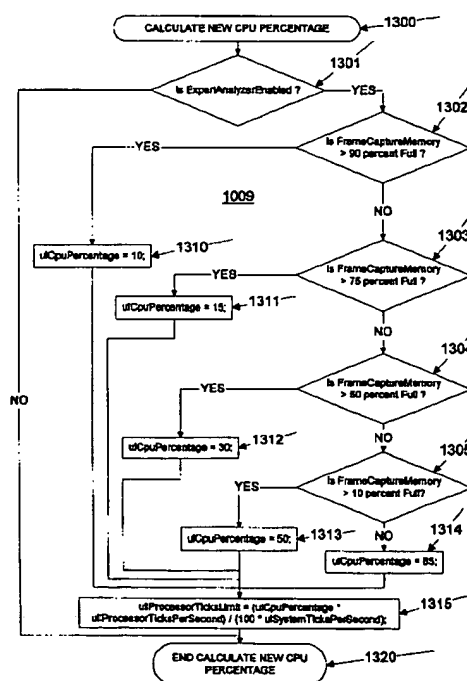
(56) **References Cited**

U.S. PATENT DOCUMENTS

- | | | | | | |
|-----------|---|---|---------|----------------|---------|
| 5,740,380 | A | * | 4/1998 | LaBerge et al. | 710/107 |
| 5,845,074 | A | * | 12/1998 | Kobata | 709/219 |
| 5,966,381 | A | | 10/1999 | Buckley et al. | 370/395 |

* cited by examiner

30 Claims, 14 Drawing Sheets



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L4: Entry 6 of 19

File: USPT

Mar 2, 2004

DOCUMENT-IDENTIFIER: US 6701380 B2

TITLE: Method and system for intelligently controlling a remotely located computer

Abstract Text (1):

A method and system for remotely accessing and controlling at least one of a target switch and a target computer using a target controller. The video information captured by the target controller is analyzed and compressed in order to reduce network traffic between the target controller and a controlling computer.

Current US Original Classification (1):

709/250

Current US Cross Reference Classification (1):

709/247

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US006701380B2

(12) **United States Patent**
Schneider et al.

(10) **Patent No.:** **US 6,701,380 B2**
(45) **Date of Patent:** **Mar. 2, 2004**

(54) **METHOD AND SYSTEM FOR INTELLIGENTLY CONTROLLING A REMOTELY LOCATED COMPUTER**

(75) **Inventors:** **Walter J. Schneider, Brier, WA (US);**
Warren C. Jones, Renton, WA (US);
Mark D. Sasten, Duvall, WA (US)

(73) **Assignee:** **Avocent Redmond Corp., Redmond, WA (US)**

(*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) **Appl. No.:** **10/365,441**

(22) **Filed:** **Feb. 13, 2003**

(65) **Prior Publication Data**

US 2003/0135656 A1 Jul. 17, 2003

Related U.S. Application Data

(63) Continuation of application No. 09/682,761, filed on Oct. 15, 2001, now Pat. No. 6,539,418, which is a continuation of application No. 09/359,376, filed on Jul. 23, 1999, now Pat. No. 6,304,895, which is a continuation-in-part of application No. 08/916,685, filed on Aug. 22, 1997, now abandoned.

(51) **Int. Cl.**⁷ **G06F 13/00**

(52) **U.S. Cl.** **709/250; 709/247**

(58) **Field of Search** 709/200, 201,
709/203, 217, 218, 219, 247, 250

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,008,747 A	4/1991	Carr et al.	358/136
5,483,634 A *	1/1996	Hasegawa	395/162
5,552,832 A	9/1996	Astle	348/420
5,576,845 A *	11/1996	Komatsu	358/433
5,757,424 A	5/1998	Frederick	348/218
5,802,213 A *	9/1998	Gardos	382/239
6,016,166 A	1/2000	Huang et al.	348/515
6,091,857 A *	7/2000	Shaw et al.	382/251
6,173,082 B1 *	1/2001	Ishida et al.	382/254
6,304,895 B1	10/2001	Schneider et al.	709/203
6,571,016 B1 *	5/2003	Mehrotra et al.	382/236

* cited by examiner

Primary Examiner—Moustafa M. Meky

(74) *Attorney, Agent, or Firm*—Oblon, Spivak, McClelland, Maier & Neustadt, P.C.

(57) **ABSTRACT**

A method and system for remotely accessing and controlling at least one of a target switch and a target computer using a target controller. The video information captured by the target controller is analyzed and compressed in order to reduce network traffic between the target controller and a controlling computer.

9 Claims, 13 Drawing Sheets

